Name: Date:

Polynomial Factoring solution (version 28)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 + 12x + 54 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(12) \pm \sqrt{(12)^2 - 4(1)(54)}}{2(1)}$$

$$x = \frac{-(12) \pm \sqrt{144 - 216}}{2(1)}$$

$$x = \frac{-12 \pm \sqrt{-72}}{2}$$

$$x = \frac{-12 \pm \sqrt{-36 \cdot 2}}{2}$$

$$x = \frac{-12 \pm 6\sqrt{2}\, i}{2}$$

$$x = -6 \pm 3\sqrt{2}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $-2 - 9i$ and $-3 - 6i$ in standard form $(a + bi)$.**

Solution

$$(-2 - 9i) \cdot (-3 - 6i)$$

$$6 + 12i + 27i + 54i^2$$

$$6 + 12i + 27i - 54$$

$$6 - 54 + 12i + 27i$$

$$-48 + 39i$$

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3. **Write function $f(x) = x^3 - 10x^2 + 31x - 30$ in factored form. I'll give you a hint: one factor is $(x - 3)$.**

Solution

	1	-10	31	-30
3		3	-21	30
	1	-7	10	0

$$f(x) = (x-3)(x^2 - 7x + 10)$$

$$f(x) = (x-3)(x-5)(x-2)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x+6)^2 \cdot (x+2) \cdot (x-1) \cdot (x-6)$$

Sketch a graph of polynomial $y = p(x)$.